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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/725,496	11/30/2000	Masayoshi Koike	PM 275294 FOO-212-US	8880
21254	7590	06/17/2004	EXAMINER	
MCGINN & GIBB, PLLC 8321 OLD COURTHOUSE ROAD SUITE 200 VIENNA, VA 22182-3817			CRANE, SARA W	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/725,496

Applicant(s)

KOIKE ET AL.

Examiner

Sara W. Crane

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,5,7-9,11 and 13-43 is/are pending in the application.
- 4a) Of the above claim(s) 7,8,13,14,16,18,20,23,26,31 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,9,11,15,17,19,21,22,24,25,27-30,32,33 and 35-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-2, 5, 9, 11, 15, 17, 19, 21, 22, 24, 25, 27-30, 32, 33, and 35-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pankove, 4,862,471, Goetz et al., 6,441,393, Koike et al., 5,945,689, and Major et al., 6,100,546.

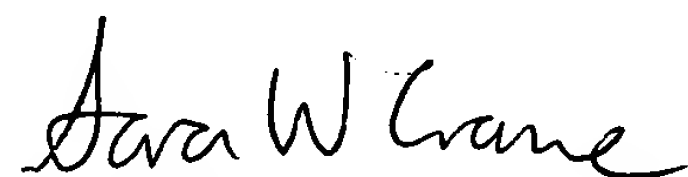
With respect to claims 1, 39, and 43, each of the first three references teaches a MQW light emitting structure (which inherently or obviously includes multiple quantum wells). The Pankove structure is InN/GaN (column 2, lines 23-30), which satisfies the formulas in claim 1, for example, because InN has x equal to 1, and GaN has y equal to 1 and z equal to 0. Goetz et al. column 3, discloses a MQW structure with a well layer of AlInN (column 3, lines 49-54). A barrier layer of GaN would have been obvious in view of the Pankove barrier layer of GaN, because it would provide a larger bandgap material. Koike et al. also teaches an MQW light emitting layer having composition ranges with overlap, and hence anticipate those of claim 1 (column 11, lines 28-33). Anticipation is the epitome of obviousness. Major et al. shows in figure 2 the band gap diagram for the AlGaInN system, which guides those of ordinary skill in the choice of materials having desired relative bandgaps, and column 2, lines 9-24, teaches specific advantages that are known for these materials, and which would motivate the use of AlGaInN materials in light emitting devices.

With respect to the dependent claims, it would have been obvious to choose the number of layers in the MQW based on the amount of desired light emission. It would have been obvious to choose layer thicknesses and relative bandgaps (of well to barrier) in order to optimize crystal quality due to lattice mismatch, for example, and to acquire desired carrier confinement. Known and usual dopants would have been obvious in order to obtain needed conductivity. These principles of optimization are well-known and usual in the art.

Note that the designation of "AlInN," as used by Goetz et al. would be interpreted by one of ordinary skill in the art as teaching the compositions in the phase diagram (figure 2 of Major et al.), or as a composition of  $\text{Al}_{0.5}\text{In}_{0.5}$ . Either interpretation would teach the composition ration of dependent claim 28, for example.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (571) 272-1652.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist, whose telephone number is (571) 272-1562.



Sara W. Crane  
Primary Examiner  
Art Unit 2811